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SWAMP AND BOG PLANTS: *IRIS VERSICOLOR* L.

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The differentiation between bogs and swamps has been of considerable interest in the past and it can not be considered as solved at the present time. Possibly there never will be any conclusion beyond stating that swamps and bogs form ends of a linear series, intergrading freely. In his studies in bogs and swamps, the senior author has endeavored to find different plants which grow under both conditions to see whether any structural differences are discernible. One such plant is *Iris versicolor* L.

Iris versicolor is a rather common swamp plant in Northern Michigan, but it also grows in bogs, although sparingly. It is best developed in swampy places just back of the shores of lakes where protection is afforded from wind, waves, ice and sand. The plant is a perennial herb, with a thickened, somewhat branched subterranean stem growing 2.5 to 10 to 25 cm. or more below the surface of the soil and bearing a few leaves and a flowering stalk at the tips. The roots extend outwards and downwards from the rootstocks. The leaves are flat, sword-shaped, light-green, parallel-veined and smooth. They are held in a vertical position by their sheathing bases. The flowers of *Iris* are too well known to need description here. The fruit is a long, more or less triangular, three lobed, stout-beaked, many-seeded capsule.

The following study was made under the senior author's direction at the University of Michigan Biological Station on Douglas Lake, Cheboygan County, Michigan, during the summers of 1922 and 1923 by Miss Elsie E. Erickson. The aim was to discover, if possible, some way of telling whether a given plant of *Iris* had grown in a bog or in a swamp. In each of several different areas in the region, investigation was made of the growth structures of the plant, after which typical individuals were brought into the laboratory, sectioned and studied.

* A contribution from the Biological Station of the University of Michigan and from the Botanical Laboratory of Kansas State Agricultural College No. 195.

The study in the field brought out a number of points of interest, but failed to reveal any sufficiently conspicuous differences between the swamp and bog plants. The form of the rhizomes and roots seemed to be essentially identical, whether the plants were growing in sandy or loamy swamps, or in the muck of bogs. The conditions which caused death of the rhizomes, viz., too great a piling up of sand or debris above them, obtained in both cases. Within limits, the *Iris* rhizome can adjust itself to changes in the soil level by growing up or down. The limit in the case of encroaching sand seems to be about 20 to 25 cm. Excellent examples of this were to be seen in the spring of 1922, following the unusually heavy icework of the winter of 1921-22 at the head of Burt Lake. Approximately 8 meters of the beach was shoved in on the swampy area at the head of the lake. This covered large beds of *Iris* with about 45 cm. of sand and killed the plants. Decayed rhizomes were found beneath the sand where *Iris* had formerly been abundant.

In general the characteristics of the stems and leaves appeared to be essentially identical throughout—the modifications which occurred in the leaves being due primarily to the amount of shade the plants were receiving. As shade was more frequently met with in bogs, particularly the higher-shrub bogs, greater etiolation of the leaves was more frequently met with there. Similar conditions in swamps however produced the same results. The only feature of difference was that the leaves from bog plants averaged a trifle narrower than those from swamps (1.8 cm. in bogs, 1.9 cm. in swamps). A study of free-hand sections of the leaves failed to reveal any differentiating characters, but in the rootstock it was found that the epidermal cells of the plants growing in bogs had very much thicker walls than those growing in swamps, (19 μ in bogs, 9 μ in swamps). In bogs, fruit was much less abundantly produced and the capsules that formed were small.

In conclusion, it would appear from this study, that in the case of *Iris versicolor* L. in the Douglas Lake, Michigan region, the visible effects of the bog environment upon this swamp plant were a slight narrowing of the leaves, a very conspicuous thickening of the cell walls of the epidermis of the rhizome, and a reduction both in the amount of fruiting and in the size of the fruit.

TABLE OF MEASUREMENTS OF *Iris versicolor*

Height of 205 swamp plants	111.5 (75.8)	30.0 cm.
“ “ 220 bog plants	126.5 (82.7)	30.6 cm.
Width of leaves of 239 swamp plants	2.7 (1.9)	0.8 cm.
“ “ “ “ 237 bog plants	3.1 (1.8)	0.7 cm.
Depth of rhizome below surface, 103 swamp plants . . .	24.9 (10.7)	2.4 cm.
“ “ “ “ “ 62 bog plants	30.4 (12.3)	3.5 cm.
Thickness of outer wall of epidermis of 70 swamp plants .	11. (9.)	8. μ .
“ “ “ “ “ “ 55 bog plants	21. (19.)	17. μ .

JOHANN DAVID SCHÖPFF

A PIONEER OF AMERICAN BOTANICAL EXPLORATION

ADOLPH TOEPFFER

Johann David Schöpff was born on March 8, 1752, in Wunsiedel, Bavaria. After graduating from the gymnasium at Hof, he studied medicine at the University of Erlangen, specializing in botany and zoology.

Early in 1777 he accompanied a regiment of Bavarian soldiers to America as an army physician. While connected with an army hospital in New York he was able to make some studies on the plants of the vicinity, and conceived the plan of writing a Flora of the State of New York. Recently there has come to light the incomplete manuscript, entitled "*Index Plantarum Noveboracensium, quarum virtutes medicamentosa partim jamjam exploratae, partim adhuc explorandae,*" which describes some 790 species of phanerogams, identifying them with Linnean species and with the plants described by Cadwallader Colden in 1744. He also describes briefly various cryptogams lent him by another Hessian surgeon, Dr. von Wangenheim. Among these were 18 ferns, 28 mosses, 4 hepatics, 37 algae, and 18 fungi. The plants are all arranged according to the Linnean system, the descriptions being in Latin.

Among the localities where plants were collected are the following:—Mr. Bayard's House, Bloomendale, Bokram Mill, Bowery, Brooklyn, Bunkers Hill, Bushwick, Coldspring, Coler Ferry, Cuylers Hook, Derkers Ferry, Dennys Ferry, Elliot's House, Flatbush, Flatlands, Flushing, Flushing Fly, Fort George, Fort Kuyphausen, Gravesend, Greenwich, Huntington, Jamaica, Jerico, Jerusalem, Kingsbridge, Laurel Hill, Morris